

### REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

To place the application in better form, Applicants submit herewith a substitute specification, which includes a new abstract. For the Examiner's convenience, also provided is a marked-up copy of the original specification showing the portions thereof which are being changed. The substitute specification includes the same changes as are indicated in the marked-up copy. Applicants' undersigned attorney has reviewed the substitute specification and submits that the substitute specification contains no new matter.

Applicants note that the Examiner has made final the restriction requirement previously set forth. To expedite prosecution, claim 19, previously withdrawn from consideration, has been canceled without prejudice or disclaimer. Applicants reserve the right to file a divisional application directed to the subject matter of this claim.

Independent claims 20 and 21 are presented for consideration. Claims 1-19 have been canceled without prejudice or disclaimer. Applicants also reserve the right to file a continuing application directed to the subject matter of claims 1-18. Claim 20 has been amended to clarify features of the subject invention, while claim 21 has been amended to recite additional features of the subject invention. Support for these changes and this claim can be found in the original application, as filed. Accordingly, no new matter has been added.

Applicants request favorable reconsideration and withdrawal of the objection and rejections set forth in the above-noted Office Action.

The drawings were objected to on formal grounds. Specifically, the Examiner required that FIGS. 10, 11A and 11B be labeled as "PRIOR ART." Applicants submit herewith replacement drawing sheets for FIGS. 10, 11A and 11B, which have been so labeled. Applicants submit that these drawing sheets overcome the Examiner's objection. Such favorable indication is requested.

Applicants note with appreciation that claims 4-18 were indicated as containing allowable subject and would be allowable if rewritten in independent form to include the recitations of their base and intervening claims and to overcome the rejections under 35 U.S.C. § 112, second paragraph, discussed below. Applicants submit that they should be entitled to the protection afforded by independent claims 20 and 21, as presented. Therefore, claims 4-18 have not been so rewritten at this time.

The specification was rejected under 35 U.S.C. § 112, first paragraph. The Examiner objected to specific recitations, by way of example, on pages 2 and 3 of the subject specification. As discussed above, Applicants submit herewith a substitute specification. The Examiner's comments were taken into consideration when presenting the substitute specification. Accordingly, this rejection has been overcome. Such favorable indication again is requested.

Claims 1-18 and 20 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Examiner asserted that the phrase "for near-field exposure," recited in each of claims 1-18 at line 1, and the phrase "for relieving stress," recited in claim 20, were not sufficiently limiting and the Examiner provided his comments for addressing this point. The Examiner contended that the term "thick" and the phrase "in a region of," both recited in claim 3, for example, were vague and unclear. The Examiner continued these assertions with regard to the term "around," recited in claims 5 and 7, asserting that it is not understood what part of the

shielding membrane includes another layer and where it is located. The Examiner further asserted that the term “toward” in claim 8 did not place the location of the intermediate layer in a particular spot rendering this claim vague, and that the terms “around,” “or” and “and/or” recited in claim 12 rendered this claim unclear and vague. As discussed above, claims 1-18 have been canceled without prejudice or disclaimer. Also, claim 20 has been amended, and claim 21 presented, in light of the Examiner’s comments. Applicants submit that these changes overcome the rejection under 35 U.S.C. § 112, second paragraph. Such favorable indication again is requested.

Turning now to the art rejections, claims 1-3 were rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese patent document number 61-065250 to Nakamura et al. Claims 1-3 and 20 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,888,488 to Miyake. Claims 1-3 and 20 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over European patent document number 1150162 to Inao et al. in view of the Nakamura et al. document or the Miyake patent. Applicants submit that the cited art, whether taken individually or in combination, does not teach or suggest many features of the present invention, as previously recited in these claims. Therefore, these rejections are respectfully traversed. Nevertheless, Applicants submit that independent claims 20 and 21, for example, as presented, amplify the distinctions between the present invention and the cited art.

In one aspect of the present invention, independent claim 21 recites a near-field exposure photomask including a deformable membrane portion having on one surface of the membrane portion a shielding membrane that has a micro aperture, and a substrate for supporting a peripheral region of the other surface of the membrane portion. The exposure is conducted in the membrane portion in a sagged condition and the photomask is designed to have a structure so as

to relieve stress that is generated at a border between the membrane portion and the substrate when the membrane portion sags. The structure is one of (a) a structure including a reinforcing member placed at the border, (b) a structure such that the substrate is partially thinned near the border, and (c) a structure including an intermediate layer that is formed between the substrate and the other surface of the membrane portion and stretches toward a center of the other surface of the member portion.

In another aspect of the present invention, independent claim 20 recites a near-field exposure apparatus that includes a light source, a stage on which an object to be exposed to light is placed, a deformable membrane portion having on one surface of the membrane portion a shielding membrane that has a micro aperture, and a substrate for supporting peripheral region of the other surface of the membrane portion. This claim further recites those features regarding exposure, as discussed above with respect to claim 21.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent claims 20 and 21.

The Examiner considers the Nakamura et al. publication to teach a contact glass mask for contact patterning of a wafer to make a semiconductor device. The Examiner considers Figure 1 of that document to show a glass mask 1 having a body 11 pushed into contact with a wafer 3 without deforming the mask body, because the mask is held to a mask support base 2 by a thick support member 12. The Examiner considers the mask to operate in a near field region and the elastically deformable support member or membrane to serve to disperse or relieve stress that would otherwise occur in the mask.

The Examiner considers the Miyake patent to teach an exposure apparatus used in the fabrication of printed integrated circuits. The Examiner references Figure 1 of that patent to

show an exposure apparatus with a peripheral seal 20 in a space between an original 1 and a resist coated wafer 7 of a packing of a hollow elastic material 20, in order to evacuate a space between the two. The Examiner considers the mask to operate in the near field region and the hollow elastic material seal to serve to disperse or to relieve stress that would otherwise occur in the mask.

The Examiner considers the Inao et al. publication to teach a near field exposure mask, method and apparatus, in which, for example, as shown in Figures 7A-7C, the near field mask 701 includes a metal thin film shading member 703 having a micro-aperture pattern 704, having apertures of two different widths. The Examiner considers the apparatus for exposure of a photoresist through the near field mask 501 held by the container or stage 505 to use a light source 509, with a photoresist layer 507 being formed on the surface of the substrate 506, which is held on a movable stage or sample table 508, as shown in Figure 5 in that publication. The Examiner considers the sample table 508 to be driven in the direction normal to the mask 501 to control the distance between the photoresist 507 on the substrate 506 and the mask 501 in order to achieve a gap of less than 100 nm, where near field light exists for exposure. The Examiner notes, however, that the Inao et al. publication does not specifically teach the use of a stress relieving structure between the patterned mask and the mask substrate or support. The Examiner relies on the Nakamura et al. document and the Miyake patent for these teachings.

Applicants submit, however, that the cited art does not teach or suggest salient features of Applicants' present invention, as recited in independent claims 20 and 21.

Applicants note that the Nakamura et al. document teaches a glass mask for use in contact exposure, in which an easily deformable support member 12 is provided around the glass mask 1 (Figure 1) in order to prevent poor contact between the glass mask and the wafer 3, which is

shown in Figures 3 and 4 of that document as being prior art. The Nakamura et al. document discusses an aspect that, providing the easily deformable member support 12, prevents deformation of the body of the glass mask and prevents pattern deviation.

Applicants note, however, that the mask discussed in the Nakamura et al. publication is not one provided for exposure which is conducted in a sagged condition, but rather, is one for which exposure is conducted while suppressing deformation of the mask. Accordingly, Applicants submit that the arrangement in the Nakamura et al. publication is remote from the present invention recited in independent claims 20 and 21.

Applicants further note that the Miyake patent discusses an apparatus that conducts irradiation of ultraviolet rays 17 to a material 7 to be exposed under a condition in which an original 1, which functions as a photomask, and the material 7, are in contact with each other. With this apparatus, the pressure of the space 14, which is formed of the original 1, the material 7 and hollow-shaped packing 13, is said to be properly reduced by insulating with the packing 13, in order to ensure proper contact between the original 1 and the material 7.

Accordingly, Applicants submit that the arrangement in the Miyake patent also is not one in which exposure is conducted in a condition where the mask is actively sagged. Accordingly, the arrangement in the Miyake patent likewise is remote from the present invention recited in independent claims 20 and 21.

Applicants note that the Inao et al. publication shows a near-field exposure mask and an exposure apparatus, in which the mask disclosed in that document is one provided for exposure, which is conducted in a condition where the mask is sagged. Applicants submit, however, that the Inao et al. publication does not recognize that a stress is generated at a border between a membrane and a substrate when the membrane portion is sagged, to which the present invention

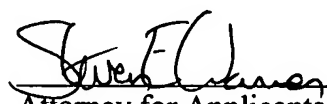
is directed. Accordingly, there is no teaching or suggestion in the Inao et al. publication of relieving the stress, in the manner of the present invention recited in independent claims 20 and 21.

For the reasons noted above, Applicants submit that the cited art, whether taken individually or in combination, does not teach or suggest salient features of Applicants' present invention, as recited in independent claims 20 and 21. For the foregoing reasons, Applicants submit that the present invention, as recited in independent claims 20 and 21, is patentably defined over the cited art, whether than art is taken individually or in combination.

Applicants submit that the instant application is in condition for allowance. Applicants request favorable reconsideration, withdrawal of the objection and rejections set forth in the above-noted Office Action and an early Notice of Allowance.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

  
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